

Haydar Hamieh

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EDUCATION

B.E. in Computer Science & Engineering — American University of Beirut (AUB) Beirut, Lebanon
Maroun Semaan Faculty of Engineering and Architecture Aug. 2024 – Expected Jun. 2028

- Relevant coursework: Design and Analysis of Algorithms, Theory of Computation, Quantum Computing, Algorithmic Graph Theory, Number Theory

PUBLICATIONS & MANUSCRIPTS

- Ali Slim, **Haydar Hamieh**, Jawad Kotaich, Yehya Ghosn, Mahdi Chehimi, Ammar Mohanna, Hasan Abed Al Kader Hammoud, and Bernard Ghanem. *QuanBench+: A Unified Multi-Framework Benchmark for LLM-Based Quantum Code Generation*. ICLR 2026 Workshop on *I Can't Believe It's Not Better* (ICBINB), Poster, 2026.
- **QuRepair: Diagnosis-Guided LLM Repair for Multi-Framework Quantum Software** Submitted to ICLR 2027
Manuscript under review. Introduces a diagnosis-guided framework for LLM-based repair of quantum software across Qiskit, Cirq, PennyLane, and OpenQASM, combining deterministic program evidence, quantum-semantic diagnosis, and behavior-based validation.

RESEARCH EXPERIENCE

Research Assistant — Center for Advanced Mathematical Sciences (CAMS), AUB Beirut, Lebanon
Generative modeling, algorithmic music, and research software engineering May 2025 – Present

- Developing the **Large Percussion Model (LPM)**, a generative system for autonomous Derbouka performance, including custom rhythmic tokenization and model-facing generation infrastructure.
- Designed rhythmic generation algorithms for micro-timing, ornamentation, and human-like swing; engineered the associated full-stack research platform and deployment pipeline.
- Designed the **.derbake** symbolic file format and data-generation pipeline for large-scale percussion datasets and model training workflows.
- Project supported by AUB's **Sciences meet Arts and Humanities (SmART) Stimulus Funding Program**.

ONGOING RESEARCH

Token Jumping on Outerplanar Graphs 2026 – Present

- Investigating the complexity of Independent Set Reconfiguration under the Token Jumping model on outerplanar graphs, where the complexity of the general outerplanar case remains unresolved.
- Studying non-trivial subclasses including cactus, bipartite outerplanar, biconnected outerplanar, and degree-restricted graphs to identify structural invariants and decomposition techniques that may generalize to arbitrary outerplanar graphs.
- Research conducted under the supervision of **Prof. Amer Abdo Mouawad**;

TEACHING EXPERIENCE

Teaching Assistant — American University of Beirut Beirut, Lebanon
Introduction to Computation (Python); Data Structures (C++) Spring 2025, Fall 2026

- Led programming laboratories and supported students in algorithmic problem solving, Python programming, C++ data structures, memory management, and complexity analysis.

Discrete Structures Tutor — A Way Academy Lebanon
University-level discrete mathematics and problem solving Fall 2027

- Tutor students in discrete structures with emphasis on formal reasoning, propositional logic, proof techniques, and structured problem solving.

INDUSTRY EXPERIENCE

Software Engineering Intern — Alfa Telecommunications Lebanon
C#/.NET systems, automation, and production tooling Jun. 2026 – Aug. 2026

- Modernized the legacy **MISP** codebase by migrating Visual Basic-based components and legacy communication mechanisms to a C#/.NET backend built around REST APIs, improving maintainability and extensibility.
- Designed a configurable multi-workflow automation system with independent directory watchers, custom queuing, Excel-driven processing, and API integrations for real customer-facing telecom operations such as SIM activation and recharge; also developed bulk WhatsApp/SMS campaign tooling.
- Built reusable operational tools including an Excel reconciliation desktop application still used internally and Playwright-based browser automation; also contributed to alfa.com.lb by replacing the static careers page with a dynamic, responsive job-listing system.